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APRIL 1961

Vol. 10 • No. 4

PUBLIC LANDS

BUREAU OF LAND MANAGEMENT



OUR PUBLIC LANDS . . .



"Conservation is a state of harmony between men and land. By land is meant all of the things on, over, or in the earth. Harmony with land is like harmony with a friend; you cannot cherish his right hand and chop off his left. That is to say, you cannot love game and hate predators; you cannot conserve the waters and waste the range; you cannot build the forest and mine the farm. The land is one organism. Its parts, like our own parts, compete with each other and cooperate with each other. The competitions are as much a part of the inner workings as the cooperations. You can regulate them—cautiously—but not abolish them."

(From "Round River—From the Journals of Aldo Leopold," edited by Luna B. Leopold, Oxford University Press, 1953.)

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COVER

Conservation and development of federally owned mineral resources is one of the Bureau of Land Management's most important responsibilities on the 477 million acres in our national land reserve. Thick rich deposits of oil shale are known to exist on public lands in Colorado, Utah, Wyoming, and Nevada. The cover shows an area near Rifle, Colorado, where the Bureau of Mines has operated an experimental oil shale mine and retort plant. From the bottom up you can see the water settling basins, pumphouse, right-of-way, housing area, retort plant, the mine road, and the mine area. For more information about this important public owned natural resource see page 5.

Issued quarterly by

UNITED STATES

DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

Washington 25, D.C.

The printing of this publication has been approved by the Director of the Bureau of the Budget, February 25, 1960.

DEPARTMENT OF THE INTERIOR

Stewart L. Udall, Secretary

BUREAU OF LAND MANAGEMENT

Karl S. Landstrom, Director

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SECRETARY of the Interior Stewart L. Udall presents a commission to Karl S. Landstrom, appointing him as Director of the Bureau of Land Management.

THE NEW DIRECTOR of the Bureau of Land Management is Karl S. Landstrom, a native of Lebanon, Oreg., and a longtime career conservationist. Mr. Landstrom has had wide and varied experience in natural resources conservation and administration.

A career civil servant, Mr. Landstrom, has had nearly 25 years of experience in the field of public land management. He comes to BLM from the staff of the House Committee on Interior and Insular Affairs.

Mr. Landstrom, 51, graduated from the University of Oregon (M.A., 1932) and began his career as an economist in flood control and water conservation with the U.S. Department of Agriculture in 1937. He has been involved in land economic studies throughout the Western States. Mr. Landstrom joined the Bureau of Land Management in 1949 as Regional Chief of Lands and Minerals, Portland, Oreg. He also served for several years as alternate member of the Department's Pacific Northwest Field Committee and consultant to the Columbia Basin Interagency Committee. In 1953, Mr. Landstrom transferred to the Washington, D.C., staff of BLM, where he worked on land classification, program planning, and land appraisals.

Secretary of the Interior Stewart L. Udall said Mr. Landstrom's broad experience in natural resource and land management activities will assure the development of realistic and progressive policies and programs in the Bureau of Land Management. Mr. Landstrom believes that the primary goal of BLM must be to manage the Nation's public lands and resources wisely, to prevent waste and destructive exploitation, and to preserve and protect the priceless heritage and destiny of the public resources in the Bureau's trust.

In the future, as in the past, BLM lands will be the primary storehouse of natural resources vital to the growth and development of the United States. In maintaining this storehouse the Bureau will continually manage our national land reserve according to its highest and best use.

In a recent speech before BLM employees Mr. Landstrom said "only through new vigor can we assure the continued conservation and development of the Nation's resource base. In the weeks and months ahead BLM will face old problems and new issues. We will face them squarely and with determination. By hard work—and I pledge you my own—the Bureau of Land Management will move forward with new vigor and a new dedication."

End

PUBLIC

LAND MORATORIUM

The Department of the Interior has ordered an 18-month moratorium on most types of applications and petitions for public lands. The order does not affect applications filed before the moratorium.

Temporary suspension of the privilege of filing applications and petitions under the public land laws will permit the Department and Bureau of Land Management to review the entire land management picture, eliminate work backlogs, and develop long-term land management policies and programs.

In recent years unethical land locators and promoters have abused the privilege of filing applications and petitions for public lands at a cost of millions of dollars to the public. The land offices of the Bureau of Land Management have been deluged with thousands and thousands of public land applications.

In addition, many earnest citizens have manifested the great American ambition to own a piece of land by filing types of applications which the Government could not efficiently handle.

Honest citizens have been hampered in their desire to obtain public land by the competition of speculators and promoters who have preyed on public ignorance of the land laws and regulations.

Land speculators and promoters have seriously impeded protection of the public interest in the 477 million acres of public lands administered by the Bureau of Land Management. The moratorium will permit development

of legislative and administrative remedies.

The moratorium will last until September 1, 1962. It does not affect any application pending in BLM offices before the order was issued. It applies only to certain types of applications and petitions under the nonmineral public land laws.

Applications, petitions, and offers under the mining and mineral leasing laws are not affected by the moratorium, nor are applications by States and local governments. Scrip rights and land settlement claims in Alaska also are not affected.

In the immediate future the moratorium will reduce the public's opportunities to apply for and obtain public lands for private use. In the long run, however, the moratorium will put public land development on a much more orderly programed basis. Under new programs it will be possible for the public to acquire more needed land in ways that will protect the national interest and the interest of the States and communities in which these valuable public lands are located.

During the moratorium the Department and the Bureau of Land Management should be able to eliminate the existing backlog of over 60,000 applications and petitions now on file for nonmineral public lands. Some of these applications have been pending for 3 or 4 years and longer. Each pending application will receive a full and fair consideration on its own merits. **End**

THE WHITE ROCK THAT BURNS

Oil shale on the national land reserve,

by Edwin H. Montgomery, Mining Engineer, BLM

OCCASIONALLY everyone entertains the thought of inheriting vast riches from some unknown source. Or of finding that something they own, and have long thought to be of little value, has suddenly become enormously valuable. If you are among this group you will be pleased to learn about your asset, as an American citizen, in oil shale deposits on public lands administered by the Bureau of Land Management.

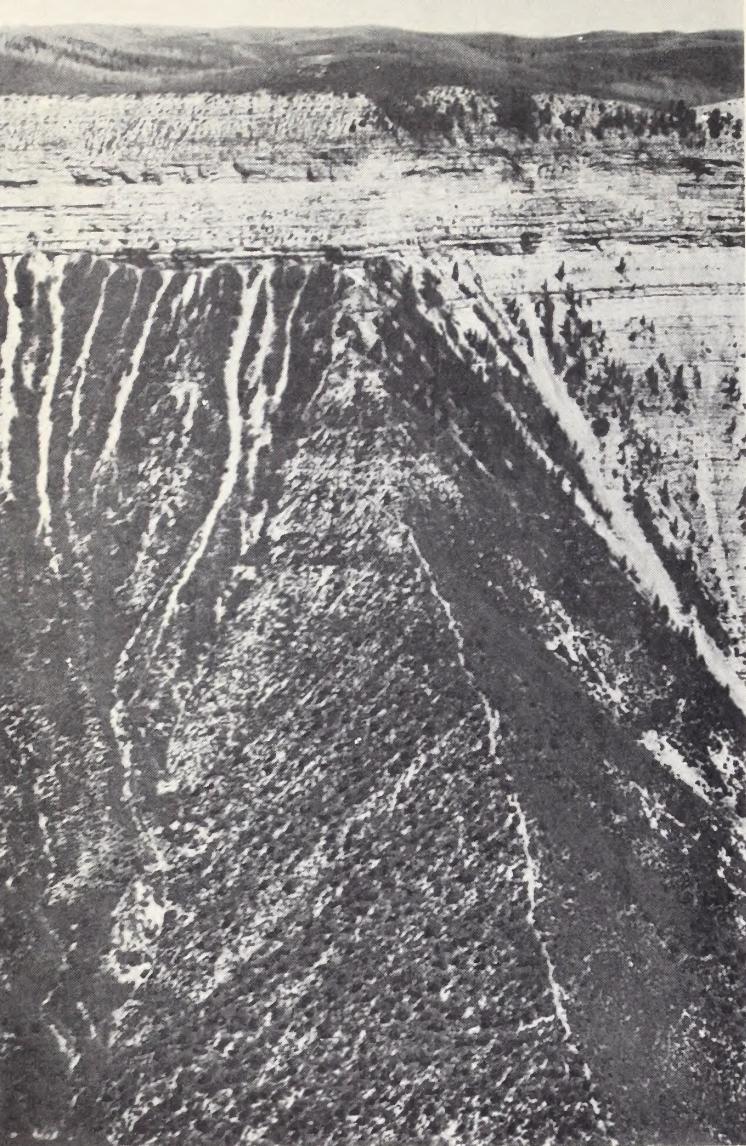
The Geological Survey and Bureau of Mines estimate that in the Piceance Creek basin of Colorado alone there are about $1\frac{1}{4}$ trillion barrels of oil in oil shale deposits which average 15 gallons of oil per ton of rock (the likely minimum grade of possible economic interest in the future). Based upon present population, this is equal to about 7,000 barrels for every person in the United

States. At a conservative in-place value of one-tenth of one percent per barrel, each citizen's share would be worth about \$7 or about \$1 billion total. At a wholesale value of \$2 per barrel, each person's share would amount to \$14,000. At the present domestic demand for petroleum, oil shale reserve represents about 300 years supply. This oil shale reserve (most of which is on public lands) also represents about 35 times present proved petroleum reserves in this country.

There are 1,400 square miles in the Colorado Piceance Creek basin which contain or are underlain by oil shale. The Geological Survey and Bureau of Mines further estimate that oil shale averaging 25 gallons of oil per ton (the likely average grade in a commercial operation) occurs in beds from 15 to 1,900 feet thick and is estimated to con-

OIL SHALE deposits on public lands near Rifle, Colo. In this area the Bureau of Mines operated an experimental mine and oil shale retort plant.





RICH OUTCROPS of oil shale occur in some extremely rugged terrain.

tain about 400 billion barrels of oil. Even this higher grade reserve amounts to about 100 years supply at the present demand.

A big advantage of oil shale over petroleum is that reserves are known and exploration would at the most cost only a few tenths of a cent per barrel. Petroleum exploration runs about \$1.25 per barrel and costs are continuously increasing as drilling goes to greater and greater depths.

Conservation and development of federally owned mineral resources is one of BLM's most important responsibilities on the 477 million acres of our public lands. Certain minerals may only be leased for development—oil and gas, potash, sodium, phosphate, coal, and in Louisiana and New Mexico, sulphur. Mining claims may be staked for other minerals under the United States mining laws. The holder of a valid mining claim, upon meeting the legal and regulatory require-

ments, may obtain patent to the minerals and the land.

Oil shale was probably first discovered by an explorer who, having used rock to surround his camp fire, discovered that his fireplace was on fire. This gave rise to the stories about "the white rock (oil shale weathers to a whitish color) that burns." A story told in Colorado tells of the settler who built his house of stone, started a fire in the open fireplace and soon found his house in ashes.

What is oil shale?

Oil shale actually contains no liquid oil as such. Oil shale is a rock that will yield oil when heated to certain temperature (retorting). It contains large amounts of organic matter which, when heated to proper temperature, vaporizes. The vapors are then condensed to form shale oil. The shale oil can be refined to form various petroleum products, such as gasoline, diesel oil, kerosene and jet fuel.

Where is oil shale found?

Oil shale is found in many countries of the world. An English patent was obtained in 1694 for the distilling of "oyle from a kind of stone." The oil shale industry has been in existence since 1850 in Scotland. Commercial operations also exist in Sweden, Spain and other countries.

Oil shale has been found in many parts of the United States. It was known to exist in Utah before the discovery of petroleum in Pennsylvania. Thick, rich beds are particularly known to exist in Colorado, Utah, Wyoming, and Nevada. The first development will probably use the oil shale in the Green River formation in Colorado where thick, high quality deposits occur in outcrops high above deep valleys which provide ready places for disposal of the spent (after removal of the oil) shale and where water and transportation facilities are readily available.

How was oil shale formed?

The oil shale in the Green River formation of Colorado, Utah and Wyoming was formed about 40 million years ago in the bottom of an extremely large, shallow lake in a subtropic climate. Each summer the lake warmed up and large amounts of carbonate were precipitated. Large amounts of animal and vegetable matter (such as algae, pollen and spores) were formed in and around the lake and settled to the bottom. The organic matter settled at a slower rate than the carbonate. This formed two thin layers—a light-colored carbonate layer and a dark organic layer. By counting these annual layers, geologists estimated that it took 5 to 8 million years for this deposit to be formed at an average rate of 2,000 years per foot of present rock.

Oil shale deposits on the public domain

The first known ruling by the General Land Office that petroleum-bearing lands were locatable



CUTTING A ROAD into the cliffs of the Green River formation in Colorado. Very rich deposits of oil shale occur in this area.

under the mining laws was a letter dated January 30, 1875, from the Commissioner to the U.S. Surveyor-General of California. The first patent for petroleum-bearing lands under the placer mining laws was Mineral Entry 18, Los Angeles, March 22, 1880. Many such patents were issued.

On August 27, 1896, the Department of the Interior changed its mind and ruled that the placer mining laws did not contemplate location of claims for petroleum. This decision resulted in Congress passing the act of February 11, 1897 (29 Stat. 526), which specifically provided for location and entry under the placer mining laws lands which were chiefly valuable for petroleum or other mineral oils.

Apparently the first references to oil shale placer locations were in letters from the Department to

various individuals in 1916, 1917, 1918 and 1919. These letters said that oil shale could be located by placer mining claims under the 1897 Act.

The first locations were made in 1915; most were made, however, from 1917 to 1919. It has been estimated that 20,000 oil shale claims were located in Colorado, Utah, and Wyoming. On February 25, 1920, the President approved an act (41 Stat. 437) which removed deposits of oil shale from location under the mining law and made them subject to lease.

In 1913 and 1914, the Geological Survey sent E. C. Woodruff and David T. Day to Colorado, Utah and Wyoming to make a reconnaissance survey of oil shales. The results of their investigations were published in Geological Survey Bulletin

(Continued on page 14)

ROAN CLIFFS. The completed road to the Bureau of Mines experimental mine portal.



location: CALIFORNIA
land management: BLM
classification: PUBLIC

by T. G. Bingham, Lands Office



AFTON CANYON. Looking east from the end of the dirt road.

THERE ARE many potential camping and picnicking sites in Afton Canyon.



CONTINUED public enjoyment of seven scenic, potential recreation areas in southern California has been guaranteed by a Bureau of Land Management classification under Section 7 of the Taylor Grazing Act.

The classification covers 120,000 acres in San Bernardino County. The lands have been identified as having a high potential for multiple purpose recreational development.

Increasing population, personal income, leisure time, urbanization, and vacation travel are placing tremendous pressures on existing public and private recreation facilities. The need for additional land for public recreation purposes is becoming a critical problem in some areas.

BLM recognizes these facts and in carrying out its land management responsibilities the Bureau gives particular attention to areas having potential for recreation use and/or development.

Such an area is Afton Canyon, one of the seven sites recently classified as multipurpose park and recreation areas in southern California. Afton Canyon is located about 36 miles northeast of Barstow, Calif., just south of U.S. Highway 91. It is here that the Mojave River emerges from under the ground, some 150 miles from its headwaters.

If one turns south off U.S. Highway 91 at Mt. Afton Station there is a dusty dirt road which crosses the desert terrain and drops down through eroded gullies and canyons into the upper portion of Afton Canyon, meeting the Mojave River at Afton Siding on the Union Pacific Railroad. This road deadends about a mile beyond the railroad siding.

It is only a short hike along the railroad tracks from the end of the road to the heart of the canyon. The canyon is about 5 miles long and about a quarter of a mile wide.

Afton Canyon is a seeming paradise of quiet beauty buried in the desert. The Mojave

IA

LIC RECREATION

os Angeles, California, BLM

River has cut its way down through bedded alluvium, ash, and lava, creating a chasm. The abrupt contorted, palisades, which form the sides, range in height from 150 to 200 feet in the upper end, and to as much as 600 feet farther downstream. These palisades are of many colors and hues, from reds and browns through purple to gray or black.

Due to the flowing surface water, vegetative growth is exceptional. Various water grasses and tules grow in and along the shallow fresh water pools while willows, mesquite, tamarisks, and Palo Verde line the river banks and coves. Distinct aquatic birds frequent this Oasis and small animals generally found in the desert are to be observed here in greater numbers. Occasional coyotes and kit foxes are more often heard than seen.

The area of Afton Canyon classified for multiple purpose recreational use and development covers about 8,800 acres. It has been under investigation by BLM and San Bernardino County for some time. There are many potential picknicking and camping sites in the Canyon. It should also be of special interest to riders, hikers, and rock hounds.

The combination of a flowing river in the desert, the steep chasm cut through bedded alluvium, distorted by lava intrusions, is distinctive. Ancient migratory Indians found the canyon hospitable, leaving behind signs and artifacts of their existence. The country adjoining the canyon is rough, barren desert, offering considerable interest to the rock hound.

Other areas in San Bernardino County, California included in the recent classification action include:

Black-opal Mountains—about 10,000 acres near Barstow. An area of tremendous lava flow dominated by two peaks. Cave shelters, showing evidence of Indian occupancy, are frequent. Petroglyphs are abundant.

Cima Dome—about 16,000 acres southeast of Baker. This area is the "dome" of a large peneplaned remnant of an ancient granite mountain range. It has potential as a camping and hiking area.

Cinder Cone—about 28,000 acres southeast of Baker. On the west and south slopes of Cima Dome there occurs some 27 or 28 major volcanic cones. This area is primarily of scenic and geological interest.

Joshua Forest—about 16,500 acres southeast of Baker. On the east and southeasterly slopes of Cima Dome there is an abundance of Joshua Trees, of great scenic and botanical interest.

Topock Gorge—about 15,500 acres along the Arizona-California border southeast of Needles. Fronting on the Colorado River, this area features contrast of the flat river area with rugged volcanic peaks and needles.

Whipple Mountain—about 26,500 acres in extreme southeastern San Bernardino County. This is a rugged, uptilted, distorted volcanic mountain range lying adjacent to the Colorado River. It offers many recreational features.

Classification of the lands by BLM dedicates them for retention in public ownership as national multiple use land management areas. Detailed plans are being developed to integrate recreation, grazing, wildlife conservation, watershed protection and mining on the areas. A formal program will be worked out with local governmental agencies, recreation and sportsmen groups, and others to provide needed facilities. Some areas will be maintained in a wild state, with access only on foot trails.

End

THE MOJAVE RIVER emerges from underground in Afton Canyon—150 miles from its source.





NEW WILDLIFE REFUGE

San Juan National Wildlife Refuge, 52 acres of rocky islands off the coast of Washington in the Strait of Juan de Fuca, was established by a recent public land order. A 9-acre tract was added to the existing Jones Island National Wildlife Refuge by the same order.

The new refuge is a natural haven for oyster catchers, glaucous-winged gulls, cormorants, puffins, guillemots, band-tailed pigeons and other migratory birds. There is an influx of northern sea birds during the winter months. The refuge includes Turn Island, Bare Island, Colville Island, Bird Rocks, and Williamson Rocks, all part of the San Juan Archipelago.

STATE PARKS

Attendance at State parks and related recreation areas in 1959 was the heaviest on record, with visits totaling 255.3 million, an

increase of 17.9 million over 1958 and more than double the total of a decade ago.

States with the heaviest park attendance in 1959 were New York, which reported 34.9 million visits; California, 22.1 million; Pennsylvania, 21.1 million; Michigan, 19.9 million; Ohio, 17.7 million; and Oregon, 10.8 million.

Day use accounted for 93 percent of the total attendance and was up 8 percent over 1958. Overnight use was up 5 percent.

States meeting the heaviest camper demands were New York, which reported a total of 2.1 million camper days; Michigan, 2 million, and California, 1.5 million. Other States reporting heavy camper use were Pennsylvania, which reported 808,199 camper days; Washington, 727,078; Connecticut, 550,349; Oregon, 517,061; and Wisconsin, 484,220. Ohio, Massachusetts and Indiana reported between 300,000 and 400,000 camper days each.

ALASKA SELECTIONS

New rules resulting from a law passed on September 14 will simplify State land grant selections in Alaska.

The rules allow the State to select and obtain a portion of an area under Federal mineral lease and to obtain mineral rights reserved to the United States in lands now in private ownership. Formerly the State could not obtain public domain lands under Federal mineral lease unless it selected the entire leased area.

Now if the State selects a portion of a leased area the minerals in that portion will remain reserved to the United States until the lease expires. Then they will be transferred to State ownership. During the lease period 90 percent of the revenues collected by BLM will go to the State and 10 percent will go into the Federal Treasury.

If the State selects the entire area under a Federal mineral lease the mineral rights will be transferred to the State along with the patent to the lands. Ex

isting mineral leases would have to be honored by the State until their expiration.

BERYLLIUM

An easy-to-perform, 5-minute field test has been developed for detecting beryllium in efforts to spur a nationwide hunt for this promising space age structural metal. Beryllium is valued at about \$70 a pound.

The testing procedure, which can be used by any prospector, reveals minute amounts of beryllium—even as little as thirteen-thousandths of 1 percent. Chemicals and equipment needed for the examination are inexpensive and are readily available from commercial suppliers. No knowledge of analytical chemistry is required.

Because it possesses both lightness and strength, beryllium metal offers many potential advantages to designers of high-speed aircraft, missiles, and space satellites.

Additional information on the field test can be found in Information Circular 7946, "Field Test for Beryllium." Copies of this report are available from the Superintendent of Documents, U.S. Government Printing Office, at 15 cents each.

NEW STANDARD OF LENGTH

On October 14, 1960, the world adopted a new international standard of length—a wavelength of light—replacing the meter bar which had served as the standard for over 70 years. The action was taken by the 11th General Conference on Weights and Measures, which met in Paris.

The new definition of the meter as 1,650,763.73 wavelengths of the orange-red line of krypton 86 will place the platinum-iridium meter bar which has been kept at Paris as an international standard for length since 1889 under the Treaty of the Meter.

The new definition of the meter relates it to a constant of nature, the wavelength of a specified kind of light, which is believed

to be immutable and can be reproduced with great accuracy in any well-equipped laboratory. Thus it is no longer necessary to return the national standards of length to Paris at periodic intervals in order to keep length measurements on a uniform basis throughout the world. Also, it is possible to measure some dimensions more accurately in terms of the new definition than was possible before.

The meter bars will not, however, be discarded. They will remain important because of the ease with which they can be used for certain types of measurement and for comparison measurements between national laboratories.

The inch now becomes equal to 41,929,399 wavelengths of the krypton light.

COPPER SUPPLY

Reserves of copper in the United States at the present time are estimated at 32½ million tons—enough to last 30 years at the present production rate of 1.1 million tons annually, according to a study made jointly by the Geological Survey and the Bureau of Mines.

The report pointed out that the reserve tonnage figure has climbed steadily in the last 30 years despite the large tonnage mined. Lowering of the average grade of mineral ores due to improved technology has accounted for most of the gains. In the last 50 years the average grade of copper ore mined in the United States has dropped from two to five percent to slightly less than one percent.

Large tonnages of low-grade copper ore not counted in the present estimate are known to exist and other areas of low-grade copper bearing rock are only partly explored. Totally new deposits are not being discovered in the United States at a rate that would maintain presently known reserves.

Most of the domestic copper reserves (76 percent) are in disseminated deposits of the West. These can be mined on a large

scale at relatively low cost. They now account for 83 percent of domestic production. The rest of the reserves are in other types of large deposits in Montana, Arizona, Michigan and Tennessee. Only about one percent of United States copper production is from small copper mines.

This Nation's copper reserve is lower in grade than that of any other major copper-producing country. In contrast with the average grade of 0.9 percent estimated for domestic ores, reserves in South America and Africa reportedly average 1.7 and 3.5 percent copper, respectively.

ON THE BOOKSHELF

Forest and Shade Tree Entomology, by Roger F. Anderson. (New York, John Wiley & Sons, Inc., 1960.) Mr. Anderson's book should prove helpful as a self-study text for those not previously trained in the rudiments of forest entomology. For those foresters with previous training in this subject, the book will provide both an excellent review and an opportunity to become acquainted with recent important developments in the field of insect control through the use and application of insecticides.

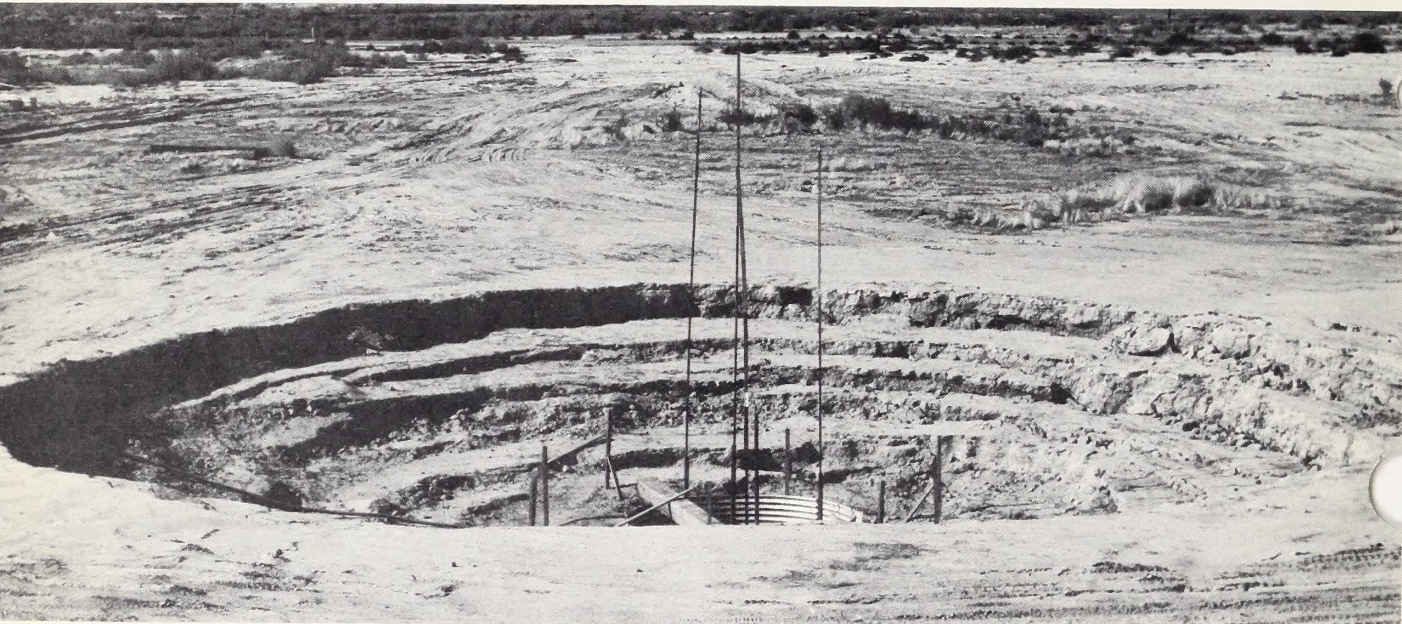
The author estimates that in the United States 90 percent of the insect-caused tree mortality and more than 60 percent of the total loss of wood growth is due to bark beetles. Most of this loss occurs in the West where over-mature timber is abundant.

Land, Wood, and Water, by Robert S. Kerr. (New York, Fleet Publishing Corp., 1960.) 380 pages.

Minerals Yearbook, U.S. Department of the Interior, Bureau of Mines, 1960. Two volumes, available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Volume I, *Metals and Non-metals (Except Fuels)*, 1,271 pages—\$4.50. Volume II, *Fuels*, 483 pages—\$2.50. A third volume, *Area Reports*, will be issued in the near future.

(Continued on page 15)

SINKING LAND



SUBSIDENCE cracks develop around an 8-foot test plot. The land surface around this California Department of Water Resources test plot settled at the rate of a foot per month for several months.

A PHENOMENON of sinking land in California has been under intensive study for three years. Land subsidence was recognized to some extent in California as early as 1898. The areas include the San Joaquin Valley, the Santa Clara Valley south of San Francisco, and the Wilmington oil field.

Some 2,000 square miles in the San Joaquin Valley have been affected. In some places the land has sunk as much as 20 feet during the last 30 years.

In the Santa Clara Valley about 230 square miles are affected. There the surface has subsided by as much as 9 feet since 1912.

There are two chief types of subsidence—shallow subsidence of light, fluffy soil above the water table occurs after initial application of irrigation water, and deep subsidence results from compaction of deposits below the water table, due chiefly

to withdrawal of ground water from confined deposits and the resulting lowering in artesian head.

Principal tools in studying the subsidence problem have been detailed topographic mapping, precise leveling, deep core holes and laboratory tests of cores, wetted test plots, water-level measurements, and geological studies.

In the San Joaquin Valley lowering of artesian head because of pumping for irrigation has caused deep subsidence as great as 20 feet; elsewhere there has been local surface sinking of as much as 15 feet due to initial water application.

In the Santa Clara Valley plots of benchmark subsidence compared to artesian-pressure fluctuations indicate that decline of pressure is a major cause. The rate of land subsidence is in general accord with the rate of pressure decline, averaging



A CRACK caused by sinking land in western Kern County, Calif., advances across a paved road.

something like a foot for each 13 feet of decline in pressure.

Deep subsidence results in broad downwarps of the land surface of many miles extent that are not readily recognized. The near-surface subsidence produces sunken irrigation ditches, tilted buildings and power lines, and undulation fields that are easily apparent even to a casual observer. Because of surface sinking, damage has already occurred to farms, buildings, pipelines, and power lines on the west side of the San Joaquin Valley.

Both types of subsidence create serious problems in the construction and maintenance of large canals, drainage systems, and levees. In view of future developments planned in the area, the

gathering of basic scientific information on the problem assumes real urgency.

Sinking land is not unique to California. A large part of the Houston-Galveston area in Texas has subsided several feet. Subsidence in Mexico City has reached 30 feet. Major subsidence also has occurred in the Lake Maracaibo area in Venezuela, in the Po River Valley of Italy, and at Osaka and Niigata in Japan.

Intensive pumping of ground water for irrigation in the San Joaquin Valley has drawn groundwater levels down extensively. The pumping now equals nearly 10 million acre-feet a year, or more than twice the capacity of Shasta Lake in California or almost one-third the capacity of Lake Mead behind Hoover Dam.

End

IN SOME AREAS pockets of land have slumped to such an extent that they are difficult to walk over.



THE WHITE ROCK THAT BURNS

(Continued from page 7)

tin 581A (1915). A further investigation of oil shale was reported by Dean E. Winchester in Survey Bulletin 641 (f) in 1917.

Beginning in 1916, the Geological Survey classified over 4 million acres of oil shale lands in Colorado, Utah, and Wyoming as valuable for petroleum and nitrogen.

In 1917, the United States entered World War I and increasing prices for crude oil caused intense interest in oil shale.

Oil shale activity reached its peak in 1923. The Bureau of Mines operated an experimental oil-shale retort near Rifle, Colo., from 1926 to 1929. After that the plant was dismantled since, by that time, the great East Texas oil field had been discovered. This resulted in a flood of oil on the market (in some places oil in the field was sold for as low as 15 cents per barrel). Coupled with the general economic depression, which began at that time, the country lost interest in substitute liquid fuels.

On April 15, 1930 an Executive Order withdrew from lease or disposal over 8 million acres valuable for oil shale, subject to valid existing rights.

In 1944, as a war measure, Congress authorized the Bureau of Mines to conduct experimental work in the mining and retorting of oil shale. This was continued until 1955. Considerable progress on economical mining methods (mining costs were reduced to 50 cents per ton) and in retorting were made.

After the war, as a result of the progress by the Bureau of Mines and the rising costs of finding petroleum, interest in oil shale again increased. Prices for oil shale claims jumped from \$30 an acre in 1946 to as much as \$400 an acre in 1949. Recent prices may be even higher than \$400 an acre.

The Bureau of Mines and private companies have drilled many core holes in the Colorado oil shale area. These holes have given much information about the deposit.

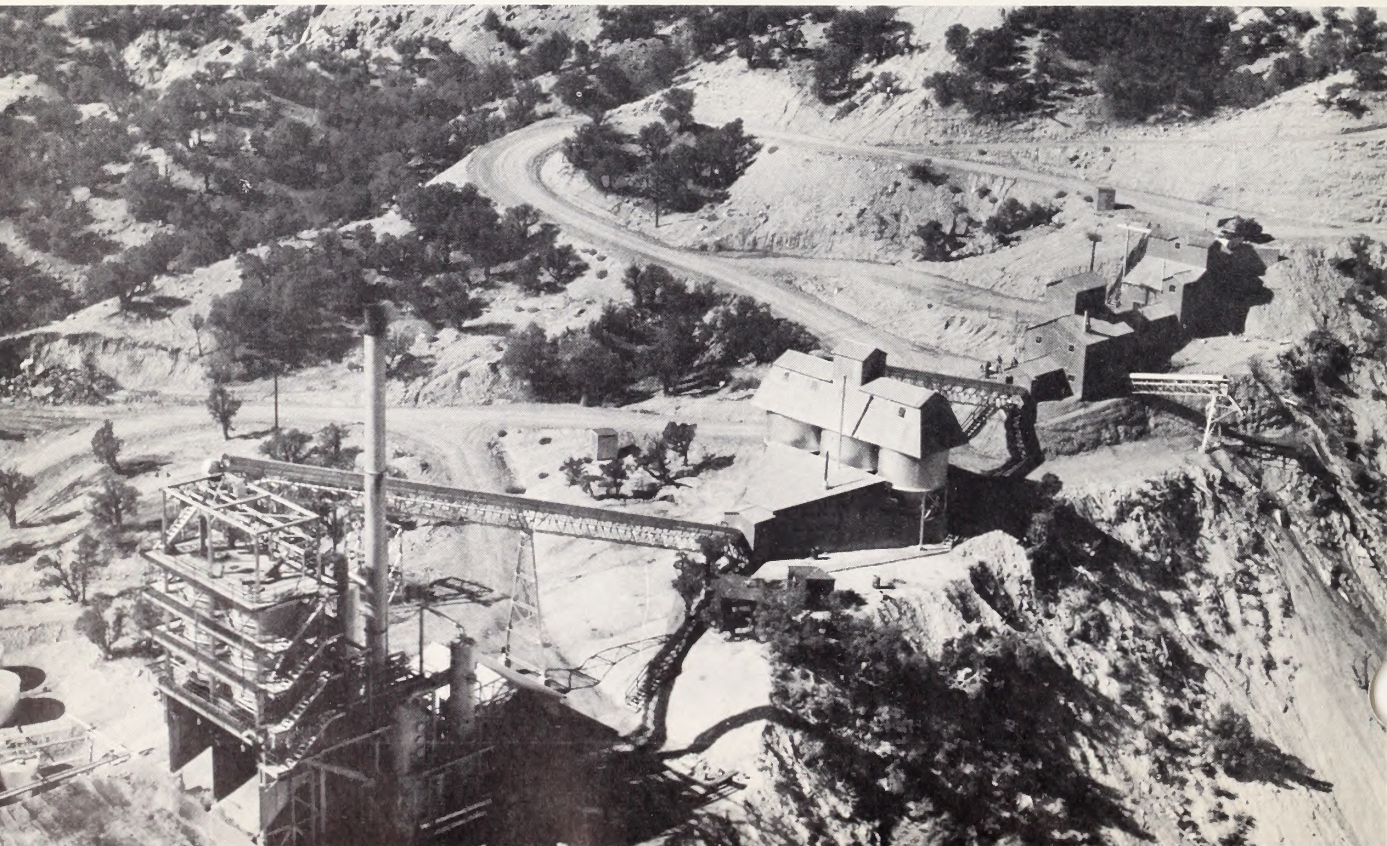
The cuttings of oil or gas wells drilled through the oil shale to the underlying formations have revealed significant new reserves of oil shale in Colorado. Beds averaging 25 gallons of oil per ton are often up to 1,900 feet thick, whereas at the outcrop they are only a couple of hundred feet thick. This extremely thick section of oil shale is covered by about 1,000 feet of overburden. It is believed that most of this thick portion is public land not covered by unpatented mining locations.

In 1955, Union Oil Company of California built a \$5 million pilot retort plant and mined shale from their nearby lands by open pit methods. The tests, announced as successful in operating the plant at a capacity of 1,000 tons per day, were concluded in 1958. The cost of retorting was reported to be 30 cents per ton.

The Denver Research Institute and the Oil Shale Corporation have recently been operating a pilot plant using a modified Swedish retorting process involving heated ceramic balls.

The Bureau of Mines and the Atomic Energy Commission have recently been considering the

A GOVERNMENT oil shale retorting plant near Rifle, Colo. (1947).



possibility of using underground nuclear blasts for the breaking of oil shale for the possible in-place retorting of the shale.

It has been estimated that there are about 1,000 acres of unpatented oil shale claims in Colorado.

What does the future hold for oil shale? This is difficult to say with the possibility of other sources of energy, such as atomic power, replacing petroleum in some uses. But with continued research on oil shale technology, it seems likely that eventually these deposits will be utilized. Especially as the costs for locating other forms of oil increase.

With the tremendous deposits available in the thickest part of oil shale, the challenging problems of mining the deposit are evident. A gigantic open pit operation or the use of nuclear energy for mining offer possible solutions to these problems. If this deposit is developed on public lands by resumption of leasing a large source of income to the Government will be available.

In any case, these deposits constitute a tremendous reserve which will be available in any emergency. **End**

ACTIVE ACRES

(Continued from page 11)

Land for the Future, by Marion Clawson, R. Arnell Held, and Charles H. Stoddard. (Baltimore, Johns Hopkins Press, 1960.) Published for Resources for the Future, 500 pages.

Politics and Grass, by Phillip O. Foss. (Seattle, University of Washington Press, 1960.) A history of the public lands of the West and an extended case study of the methods and techniques used in the formulation of public policy, 288 pages.

Surveying Our Public Lands, U.S. Department of the Interior, Bureau of Land Management, 1960. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Price 10 cents. Colorful

16-page booklet outlines the growth of the public domain and the history of surveying in the United States. It describes the three general classes of surveying performed in this country and gives a very simple yet thorough description of the rectangular survey system used in laying out and subdividing all public lands. The new system of protracted surveys and cadastral surveys from the air are also covered. Specimens of field notes and a public land plat of survey are included.

The Ephemeris, 1961, U.S. Department of the Interior, Bureau of Land Management. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Price 30 cents. Issued annually by BLM for use of cadastral engineers. Presents information relating to daily positions of the sun and hourly changes in declinations, upper culminations and elongations of Polaris, and semimonthly positions of 28 selected stars. Now in its 52d annual edition it is the only official publication of its kind arranged for the use of cadastral engineers rather than astronomers. **End**

H.R. 1257, 86th Congress, Second Session

UNAUTHORIZED USE OF PUBLIC LAND

"* * * A fundamental aim of the Department should be the proper management and disposition of the lands and resources under its jurisdiction. Unauthorized use * * * interferes with orderly management or disposition and must be promptly and vigorously controlled.

"* * * failure of the Department to eliminate unauthorized uses or to transform them into an authorized status leads to the spread of unauthorized use, deprives the Treasury of current revenues, and breeds disrespect for the property rights of the Government. Each Government employee has a duty of reporting trespass on public land, and the officers to whom it is reported have a duty of diligent action until the case is finally terminated." **End**

U.S. GOVERNMENT PRINTING OFFICE:1961 O-583964

OUR PUBLIC LANDS is the official publication of the Bureau of Land Management, U.S. Department of the Interior. Issued four times yearly in January, April, July and October.

Robert E. Wilber, Editor

SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON 25, D.C.

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